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10/517448

DT05 Rec'd PCT/PTO 09 DEC 2004



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May 6, 2004

PCT-Application No.: PCT/IB2002/002181

Applicant: Nokia Corporation

Our ref.: WO 33191

(Frist: 11.5. Eing.)

In response to the Written Opinion dated March 12, 2004.

Attached is submitted a new set of claims 1 to 19 on which the further International Preliminary Examination Proceedings is to be based.

New method claim 1 has been formed by combining original claims 1, 2. New independent system claim 10 is based on original claims 11, 12. New network entity claim 19 is based on original claim 21 and has been amended by adding the features of original dependent claim 12.

Attached dependent claims 2 to 9, and 11 to 18 are based on original claims 3 to 10, and 13 to 20.

According to the independent claims, a method, system and network element for adaptive setting or reservation of channelization codes and/or power for downlink channel is provided wherein three kinds of measurements are carried out, namely averaged transmitted power of a PDSCH, relative activity factor of the PDSCH, and weighted code blocking

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rate. The root spreading factor and power are adaptively adjusted based on these three kinds of measurements.

Reference D1, EP-A-1 209 936, has been cited mainly with respect to the original independent claims. No patentability objections were raised against the subject-matter of original dependent claim 2 (now included into all independent claims).

Further, the International Search Report likewise lists this reference D1 only with regard to the original independent claims as relevant. As to original claims 2, 12, this reference is correctly classified as representing only general state of the art which is not considered to be of particular relevance.

The claimed subject-matter thus contains novel matter which is based on inventive step.

It is respectfully requested to issue an IPER confirming patentability of the subject-matter of the attached claims.

In case of any further objections, issuance of a second Written Opinion is requested.

Ronald Roth  
Patentanwalt  
**TBK-Patent**

Enclosure (via fax & mail):  
New set of claims 1 to 19

Enclosure of May 6, 2004

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**CLAIMS**

10           1. A method for adaptive setting or reservation of  
channelization codes and/or power for downlink channel in a  
communication network, using parameters ( $SF_{min}$ ,  $P_{txPDSCHallowed}$ )  
for minimum allowed Spreading Factor, SF, and/or allowed  
power level, the parameters being set depending on the  
15 traffic load, the total cell load and/or the availability of  
channelization codes, wherein three kinds of measurements are  
performed:

          1. Average transmitted power of a physical shared  
downlink channel, PDSCH,

20           2. Relative activity factor, A, of the PDSCH, and

          3. Weighted code blocking rate, B,

and adaptive adjustment of root spreading factor and power is  
based on these three kinds of measurements.

25           2. The method of claim 1, wherein a criteria for  
adjustment of the allowed power level is:

          if A is smaller than  $TH_{A1}$ , and  $P_{txPDSCHest}$  is smaller  
than  $(P_{txPDSCHallowed} - X)$ , then decrease the reserved power,  
preferably by X or a fraction thereof,

30           A representing an activity factor of the downlink channel,  
 $TH_{A1}$  a threshold parameter,  $P_{txPDSCHest}$  the estimated power of  
the downlink channel,  $P_{txPDSCHallowed}$  the power allowed for the  
downlink channel, and X a certain set value.

3. The method of claim 1, or 2, wherein a criteria for adjustment of the allowed power level is:

if  $A$  is greater than  $TH_{A2}$ , and  $P_{txDSCHest}$  is greater than  $(P_{txPDSCHallowed} - X)$ , then increase the allowed power by  $X$ ,  
5  $A$  representing an activity factor of the downlink channel,  $TH_{A2}$  a threshold parameter,  $P_{txDSCHest}$  the estimated power of the downlink channel,  $P_{txPDSCHallowed}$  the power allowed for the downlink channel, and  $X$  a certain set value.

10 4. The method of any one of the preceding claims, wherein a criteria for adjustment of the minimum spreading factor,  $SF_{min}$ , is:

if  $B$  is greater than  $TH_B$ , and  $A$  is greater than  $TH_{A2}$ , then decrease  $SF_{min}$  (allow higher bit rates),

15  $B$  representing a weighted code-blocking rate,  $A$  an activity factor of the downlink channel, and  $TH_B$  and  $TH_{A2}$  threshold values.

20 5. The method of any one of the preceding claims, wherein a criteria for adjustment of the minimum spreading factor,  $SF_{min}$ , is:

if  $B = 0$  (zero), and  $L_{code}$  is greater than  $TH_{code}$ , then increase  $SF_{min}$  (maximum bit rate is decreased),

25  $B$  representing a weighted code-blocking rate,  $L_{code}$  a current load of a code tree, and  $TH_{code}$  a threshold parameter.

6. The method of any one of the preceding claims, wherein a method for channelization code allocation comprises a step of reserving a new root code with a given spreading factor (Spreading Factor), and a subsequent step of deciding  
30 where in a code tree this reservation is to be made.

7. The method of claim 6, wherein codes for downlink

basically are assigned in the code tree starting from a certain limb of the code tree, and codes are assigned for users primarily in another limb of the code tree.

5           8. The method of claim 6 or 7, wherein a default capacity is allocated to a territory, e.g. DSCH territory to be used by HS-DSCH and DSCH, when the total code tree load allows this, wherein spreading factor SF is only increased if the code tree is highly loaded.

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          9. The method of any one of the preceding claims, wherein total cell load is measured by power.

          10. A system for adaptive setting or reservation of  
15 channelization codes and/or power for downlink channel in a communication network, using parameters ( $P_{txDSCHallowed}$ ,  $SF_{min}$ ) for minimum allowed Spreading Factor, SF, and/or allowed power level, the parameters being set depending on the traffic load, the total cell load and/or the availability of  
20 channelization codes,

          wherein the system is adapted to perform three kinds of measurements:

          1. Average transmitted power of a physical shared downlink channel, PDSCH,  
25           2. Relative activity factor, A, of the PDSCH, and  
          3. Weighted code blocking rate, B,  
and to base adaptive adjustment of root spreading factor and power on these three kinds of measurements.

30           11. The system of claim 10, wherein a criteria for adjustment of the allowed power level is:

          if A is smaller than  $TH_{A1}$ , and  $P_{txDSCHest}$  is smaller than  $(P_{txPDSCHallowed} - X)$ , then decrease the reserved power,

preferably by  $X$  or a fraction thereof,  
A representing an activity factor of the downlink channel,  
 $TH_{A1}$  a threshold parameter,  $P_{txDSChest}$  the estimated power of  
the downlink channel,  $P_{txPDSCHallowed}$  the power allowed for the  
5 downlink channel, and  $X$  a certain set value.

12. The system of claim 10, wherein a criteria for  
adjustment of the allowed power level is:

if  $A$  is greater than  $TH_{A2}$ , and  $P_{txDSChest}$  is greater  
10 than  $(P_{txPDSCHallowed} - X)$ , then increase the allowed power by  $X$ ,  
 $A$  representing an activity factor of the downlink channel,  
 $TH_{A2}$  a threshold parameter,  $P_{txDSChest}$  the estimated power of  
the downlink channel,  $P_{txPDSCHallowed}$  the power allowed for the  
downlink channel, and  $X$  a certain set value.

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13. The system of any one of the preceding system  
claims, wherein a criteria for adjustment of the minimum  
spreading factor,  $SF_{min}$ , is:

if  $B$  is greater than  $TH_B$ , and  $A$  is greater than  
20  $TH_{A2}$ , then decrease  $SF_{min}$  (allow higher bit rates),  
 $B$  representing a weighted code-blocking rate,  $A$  an activity  
factor of the downlink channel, and  $TH_B$  and  $TH_{A2}$  threshold  
values.

25 14. The system of any one of the preceding system  
claims, wherein a criteria for adjustment of the minimum  
spreading factor,  $SF_{min}$ , is:

if  $B = 0$  (zero), and  $L_{code}$  is greater than  $TH_{code}$ ,  
then increase  $SF_{min}$  (maximum bit rate is decreased),  
30  $B$  representing a weighted code-blocking rate,  $L_{code}$  a current  
load of a code tree, and  $TH_{code}$  a threshold parameter.

15. The system of any one of the preceding system

claims, wherein a method for channelization code allocation comprises a step of reserving a new root code with a given spreading factor SF, and a subsequent step of deciding where in a code tree this reservation is to be made.

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16. The system of claim 15, wherein codes for downlink basically are assigned in the code tree starting from a certain limb of the code tree, and codes are assigned for users primarily in another limb of the code tree.

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17. The system of claim 15 or 16, wherein a default capacity is allocated to a territory, e.g. DSCH territory to be used by HS-DSCH and DSCH, when the total code tree load allows this, wherein spreading factor SF is only increased if the code tree is highly loaded.

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18. The system of any one of the preceding system claims, being adapted to measure the total cell load by measuring power.

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19. A network entity, preferably to be used in a method as defined in any one of the preceding method claims, or in a system as defined in any one of the preceding system claims, for adaptive setting or reservation of channelization codes and/or power for downlink channel in a communication network, in particular for downlink shared channel, DSCH, and high speed downlink shared channel, HS-DSCH, using parameters ( $P_{txDSCHallowed}$ ,  $SF_{min}$ ) for minimum allowed Spreading Factor, SF, and/or allowed power level, the parameters being set depending on the traffic load, the total cell load and/or the availability of channelization codes,

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wherein the entity is adapted to perform three kinds of measurements:

1. Average transmitted power of a physical shared downlink channel, PDSCH,
  2. Relative activity factor,  $A$ , of the PDSCH, and
  3. Weighted code blocking rate,  $B$ ,
- 5 and to base adaptive adjustment of root spreading factor and power on these three kinds of measurements.